Croninia kingiana (Epacridaceae), a change in status for *Leucopogon kingianus*

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Abstract

Powell, J.M. *Croninia kingiana* (Epacridaceae), a change in status for *Leucopogon kingianus*. Nuytsia 9 (1): 123-130 (1993). *Leucopogon kingianus*, an endemic Western Australian species exhibiting features atypical of *Leucopogon* is transferred to the new monotypic genus *Croninia* J. Powell as *C. kingiana* (F. Muell.) J. Powell.

Notes on its distribution and ecology are given and its relationships within the tribe Styphelieae discussed.

Introduction

Leucopogon kingianus, a species endemic in Western Australia, exhibits a number of features unusual in the genus: the paired keeled fleshy bracts at the base of the inflorescence, the conspicuous flowers with large pale-coloured bracteoles and sepals, the cylindrical corolla-tube with the lobes spreading horizontally immediately above the sepals, the linear bifurcate anthers, hirsute style and villous ovary (Figure 1).

Described initially by F. Mueller (1893) as *Styphelia kingiana* it was transferred to *Leucopogon* by C.A. Gardner in his census of Western Australian plants (Gardner 1931). Mueller (1893) stated that its relationships were 'near *S. rufa* [*Leucopogon rufus* Lindl.], which likewise is an inhabitant of desert-regions. It bears also some resemblance to *S. xerophylla* [*Astroloma xerophyllum* (DC.) Sond.].' The former relationship would place it within Section *Pleuranthus*, series *Concavae* of Bentham (1869), but Gardner (1931) placed it within series *Planifoliae* Benth. next to *Leucopogon strictus* Benth. His reason for doing so is unclear.

Willis annotated a specimen collected in 1949 by J.C. Kissane from Cannington with detailed drawings of the flower structure; he commented that the Western Australian Herbarium held the opinion that the taxon probably represented a new genus of Epacridaceae (Willis 1953, MEL 87664 specimen annotation). Franks & Watson (1963) described the pollen under the name *Styphelia kingiana* F. Muell. and commented that it was wrongly placed in that genus. They stated 'It does not resemble any other genus [of Epacridaceae] very closely, and its distinctness should be recognised taxonomically.'

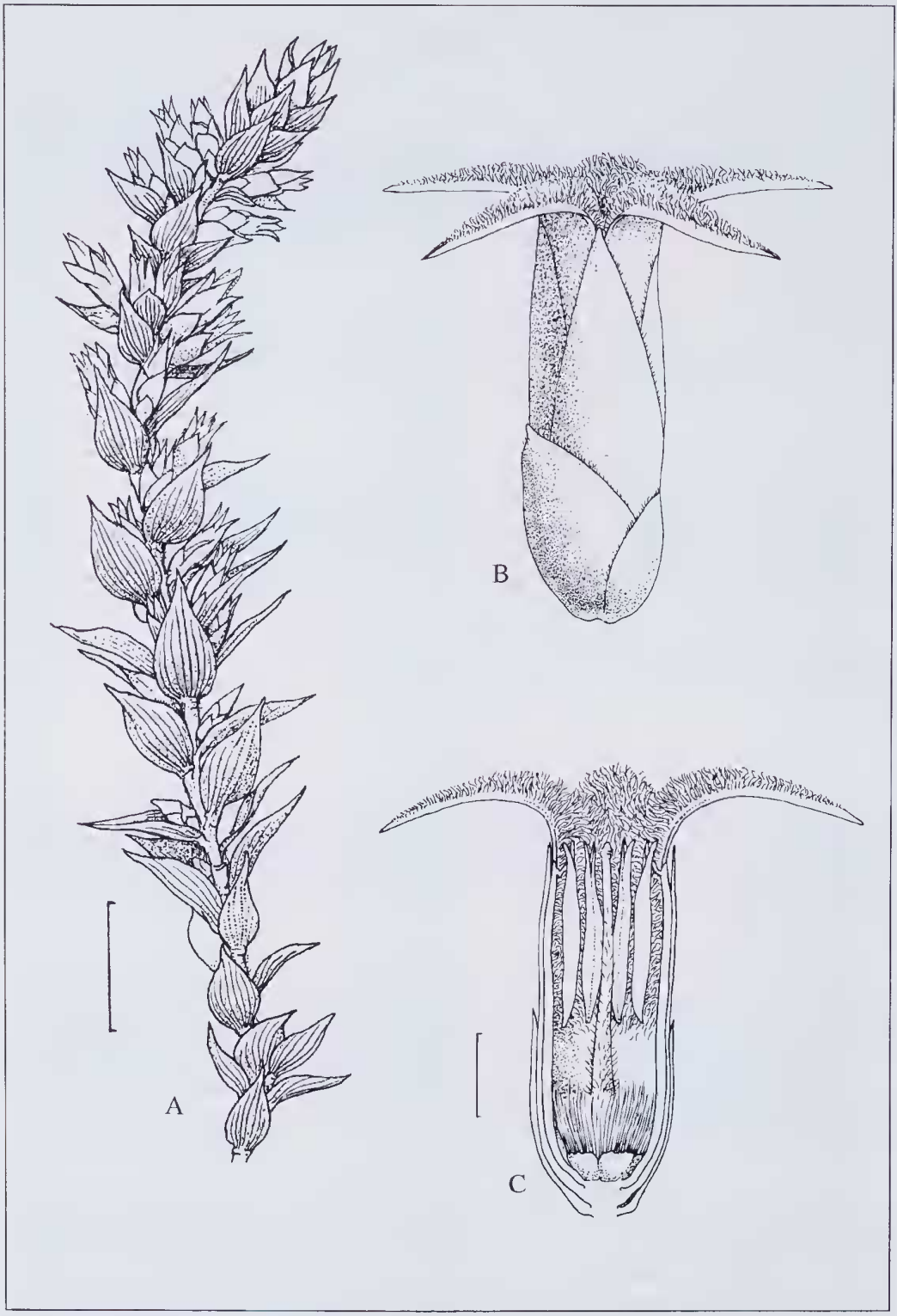

Figure 1. Flowering branch and flower structure of *Croninia kingiana*.. A: habit (scale bar = 10 mm) B, C: flower structure and section (scale bar = 2 mm).

Recent cladistic analyses (Powell *et al.* in press) also indicate that the taxon should be considered as a distinct genus. *Leucopogon kingianus* belongs to sub-tribe Styphelinae in the tribe Styphelieae (Powell unpublished data) together with the genera *Astroloma, Conostephium, Coleanthera, Styphelia, Melichrus* and *Leucopogon* section *Pleuranthus*. While the leaf fibre pattern (Figure 2E), distribution of the stomata on the abaxial surface only, and ornamentation of the corolla hairs (Figures 3A, B) are typical of members of the tribe Styphelieae, the pollen of this taxon appears unique in having an annulus surrounding the pores, and a verrucate surface pattern (Figure 3E). The suggested possible relationships with *Leucopogon rufus* or with *Astroloma xerophylla* (Mueller 1893) are not supported by the detailed morphological data.

Leucopogon kingianus is related to the genus *Conostephium* which also has linear bifurcate anthers and short terete filaments attached to the anther immediately below the bifurcation. *Conostephium* is unique however in having its corolla-lobes joined over most of their length to form a cone. The corolla hairs of *Conostephium* are smooth-surfaced rather than ornamented, as in *Leucopogon kingianus* (Figures 3A, B), and leaf venation is sub-parallel or actinodromous in most species of *Conostephium* while it is strictly parallel in *L. kingianus* (Figure 2B). The pollen of the two genera differ also.

Croninia J. Powell, gen. nov.

Frutex parvus. Folia simplicia, spiralia, parallelinervia. Inflorescentiae axillares; flores solitariae, bracteolis subtendis paucis et bracteis binatis, carinatis basi. Sepala quinque, scariosa. Corolla quinqueloba; tubus cylindricus, intus pubescens; lobi breviter barbati, aestivione valvata. Stamina quinque, tubo corollae proxime sub fauce inserta; filamenta brevia, teretia; anthera lineares, apice breviter bilobo, fissura singulari longitudinali dehiscentes. Ovarium quinqueloculare, ovulis in quoque loculo solitariis, placentatione apicali; stylus longus, in parva depressione ad apicem ovarii inserta; stigma truncata. Nectarium annulare, margine lobato. Drupa sicca.

Small *shrub*; *branchlets* pubescent with simple unicellular hairs. *Leaves* simple, spiral, shortly petiolate, strongly parallel-veined. *Flowering shoots* auxotelic; pherophylls persistent. *Flowers* solitary, axillary, subtended by a few bracteoles and with a pair of triangular keeled bracts at the base of the short peduncle. *Bracteoles* grading upwards in size to the sepals, scarious, unkeeled, ciliolate on the margins. *Sepals* 5, scarious, unkeeled, ciliolate on the margins. *Corolla* pentamerous; tube cylindrical, pubescent inside with ornamented hairs; lobes triangular, thick and fleshy, valvate in bud, shortly bearded on the upper surface. *Stamens* 5, inserted just below the throat of the corolla; filaments short, terete, attached to the anther dorsally immediately below the bifurcate apex; anthers linear, bifurcate at the apex, dehiscing by a single longitudinal slit. *Gynoecium*: style equal to or longer than the corolla tube, inserted in a small depression at the ovary apex; stigma truncate; ovary 5-locular with a single pendulous ovule per loculus; placentation apical. *Nectary* annular. *Fruit* a drupe, the mesocarp thin and dry, the endocarp hard and bony.

The genus is named in honour of Michael and Mary Cronin (father and daughter) who farmed near Dumbleyung from the early 1880's. They collected botanical specimens for Ferdinand Mueller from many different areas between Perth and Albany and eastwards to the goldfields (Diels in Carr 1981, Hamersley 1981).

Croninia kingiana (F. Muell.) J. Powell stat. et comb. nov. (Figure 1)

Basionym: Styphelia kingiana F. Muell. The Victorian Naturalist 10:78 (1893)

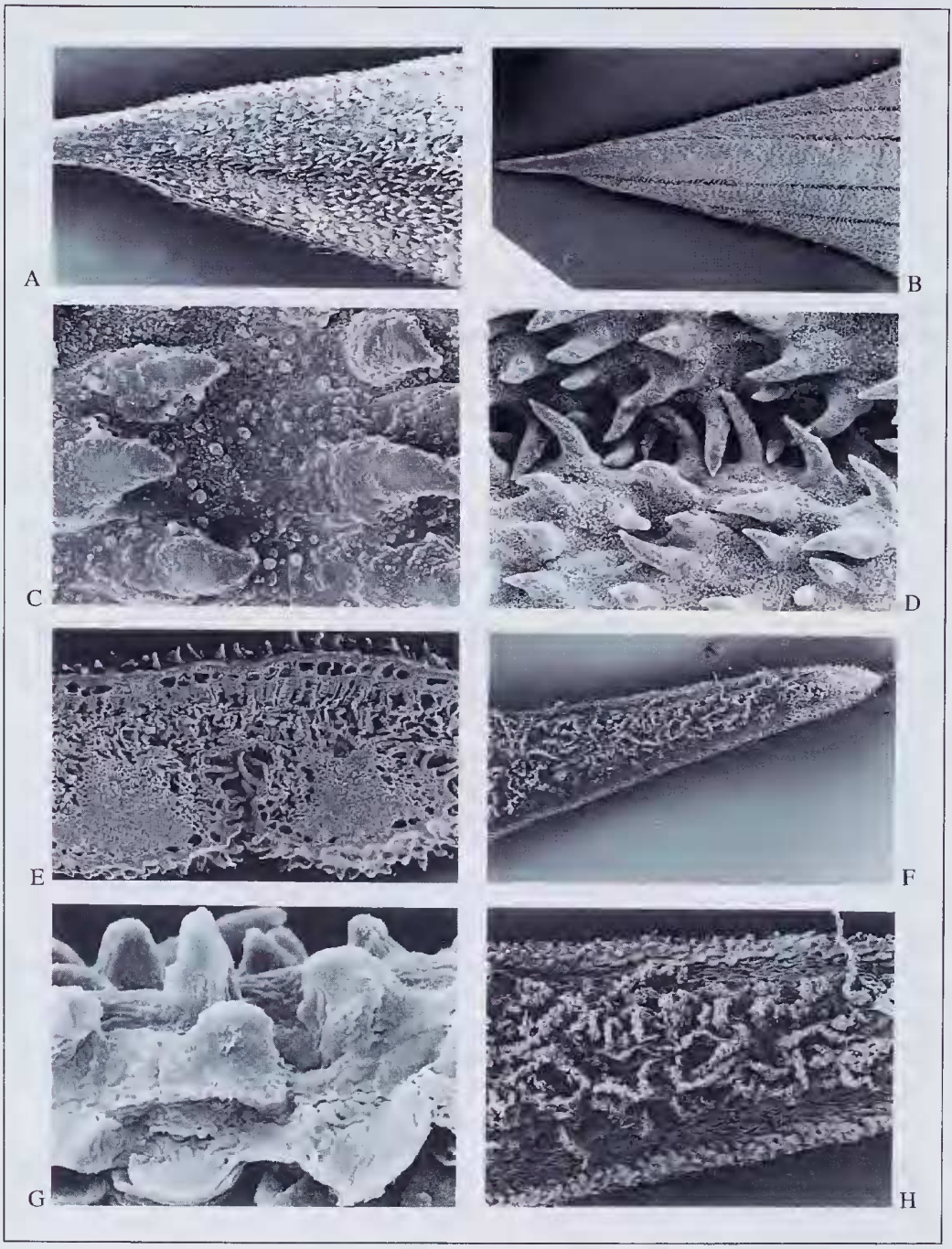

Figure 2. Scanning electron micrographs of leaves and corolla lobe. A: adaxial leaf tip (x80); B: abaxial leaf tip (x80); C: adaxial hairs and wax (x2550); D: abaxial surface near furrows (x1300); E: leaf transverse section (x500); F,H: corolla lobe and hairs (x130; x400); G: lobe margin (x3800).

Type citation: 'Near Lake Deborah; Cronin.' *Holotype*: Western Australia: Coolgardie: Lake Deborah, *Cronin,* 1893 (MEL 1512224).

Synonym: Leucopogon kingianus (F. Muell.) C.A. Gardner, Enum. Pl. Austral. Occ. 105 (1931).

An erect, compact *shrub*, 40-100 cm high. *Stems* slender, erect, grey or dark grey-brown, glabrous, with thin tessellated to flakey bark, with prominent leaf-scars; *branchlets* yellow-brown or red-brown, usually densely hispidulous. *Leaves* bluish green, evenly spaced along the branches or sometimes more crowded towards the branch ends, erect to sub-erect or occasionally horizontally spreading, ovate, 3.3-11.6 mm long, 1.5-5.6 mm wide; apex acute with a 0.4-1 mm long aristate tip (Figure 2B); base cuneate or truncate; petiole poorly developed, 0.5-1 mm long, glabrous or scabrous; lamina thick, slightly concave adaxially, concolorous or slightly discolorous, scabrid to hispidulous (Figure 2A) and often hispid near base adaxially, scabrous to densely hispidulous abaxially (Figure 2B); venation inconspicuous adaxially, strongly parallel-ribbed and grooved abaxially with 5-9 veins (Figures 2B, D, E), not branching to the margins; margin minutely denticulate. Young seasonal growth leaves are smaller, almost orbicular and with a shorter tip. *Inflorescences* clustered near the branch tips, the flowers large, extending past the leaves, white, erect; *peduncles* very short; rudiment absent. *Basal bracts* ovate-triangular, keeled, fleshy, 1.6-2 mm long, 0.7-1.4 mm wide, acute, glabrous or scabrous and with ciliolate margins. *Bracteoles* 3 or 4, orbicular, 1.5-6 mm long, 2-6 mm wide, pale yellow-green, sub-obtuse to obtuse, apiculate, glabrous or scabrous outside, the margins ciliolate to ciliate near the apex. *Sepals* ovate, 9-10.3 mm long, 2.3-3.7 mm wide, pale yellow-green, acute, apiculate, glabrous or scabrous towards the apex outside, with ciliolate to ciliate margins. *Corolla-tube:* pale yellow-green, shorter than the sepals, 6.7-8.3 mm long, 1.9-4 mm wide, glabrous outside or scabrous over the upper 1-2 mm, pubescent inside to near base with ornamented hairs (Figure 3B); *lobes* always shorter than the corolla-tube, white, erect at the base, horizontally spreading above, 4.2-6 mm long, 1-1.8 mm wide, very acute (Figure 2F), the margin minutely serrate-papillose near the apex or overall (Figure 2G), externally glabrous or scabrous, internally tomentose near base, shortly bearded above, the hairs becoming shorter towards the apex and with the upper 0.5-1 mm glabrous (Figures 2F, H); lobe hairs long and twisted, with sparse to dense long-rectangular tubercules on the surface (Figure 3A). *Anthers* pink to brown, linear, 4.1-4.9 mm long, bifurcate (Figure 3C) and sterile over the upper 0.3-0.7 mm, acute at the base (Figure 3D); *filaments* 0.2-0.6 um long, fleshy, terete, attached below the bifurcate apex (Figure 3C); pollen monad, spherical, 36-42 µm diameter, 8- periporate, the pores with a thickened annulus, the surface fine-verrucate; no tetrad scar obvious (Figure 3E). *Ovary* dark green, ovoid or pyriform, 1.4-2 mm high, 0.7-1.3 mm wide, sub-angular over the lower half, bristly at the apex and clothed with longer hairs (up to 3 mm long) from near the base (Figure 3F), 5-locular; *style* woolly-white (Figures 3F-I), 7.5-10 mm long, usually longer than the tube but hidden in the erect corolla-lobe bases, hollow and 5-channelled in transverse section, slenderly obclavate but narrowing abruptly at the ovary and inserted in a shallow depression at the apex; *stigma* small, truncate or obscurely 5-lobed (Figure 3G), 0.1-0.2 mm high. *Nectary* annular but very deeply lobed (Figure 3F), 0.6-0.9 mm high, glabrous, with shallowly lobed upper margin. *Fruit* ovoid, dry, 4-5 mm high, c. 3 mm across, covered with long erect silky hairs; endocarp woody, ribbed; style base persistent.

Selected specimens examined. WESTERN AUSTRALIA: IRWIN: Badgingarra, *A.C. Burns* 107, 18 Sep. 1971 (PERTH); Brand Highway (153 m.p.) [41 km N of Badgingarra], *Demarz* 10321, 7 Oct. 1984 (PERTH); Cadda Road, Badgingarra area, *F.W. Humphreys* 5678/65, 14 Sep. 1965 (PERTH); 1.6 km S of Mullering Brook on Brand Hwy, S of Badgingarra, *R. Johnson* 3229, 25 Sep. 1976 (BRI, PERTH); 9 mls E of Mt Peron, *Newbey* 2300, 31 Aug. 1965 (PERTH). DARLING: Drummond: base of Darling Range, *R.J. Cranfield* 44, 12 Oct. 1977 (PERTH); Prinsep Road, Jandakot, *J. Dodd,* 9 May 1978 (PERTH 02429853); Gnangara, *C.A. Gardner* 13118, 13 July 1971 (PERTH);

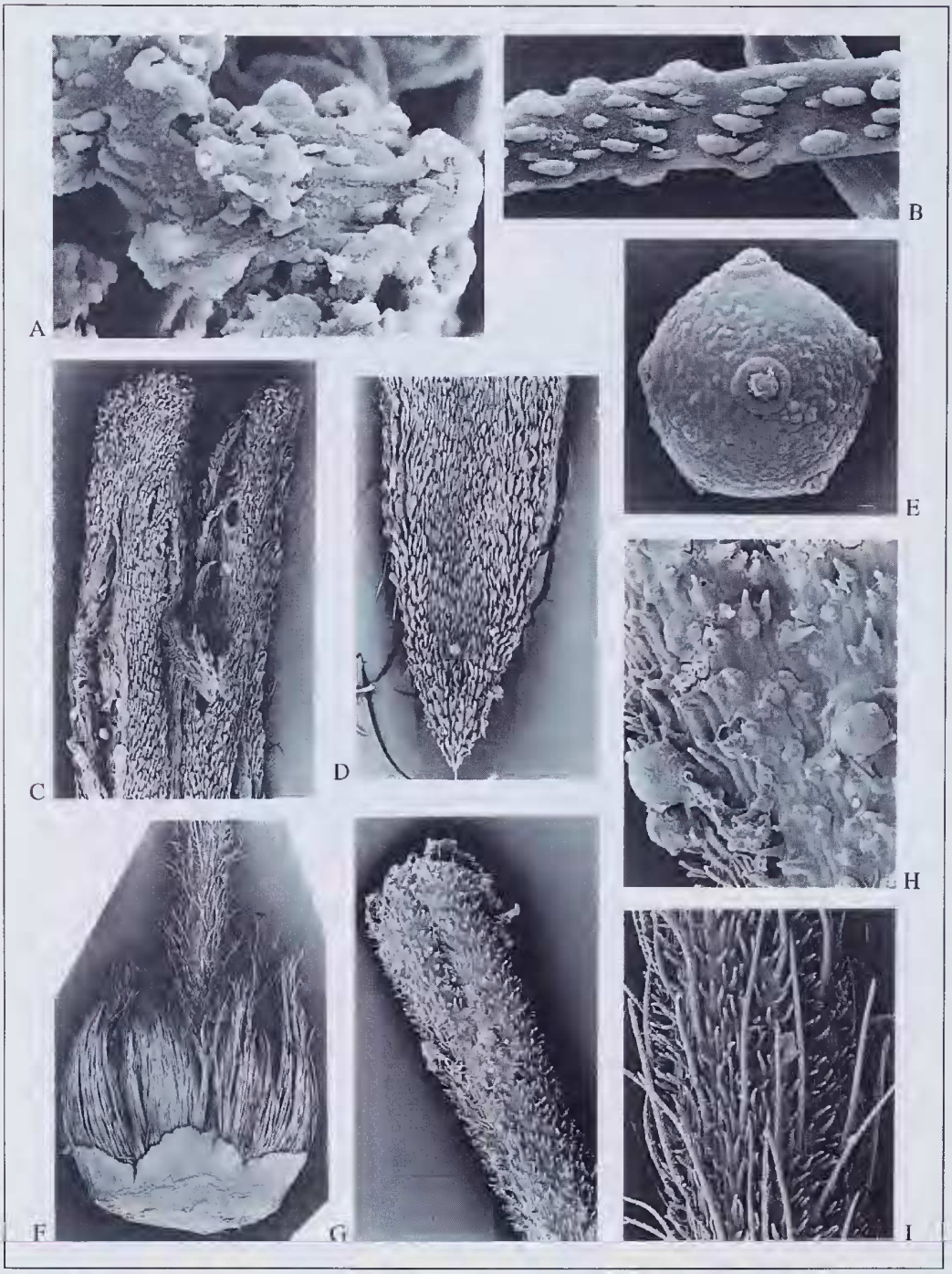

Figure 3. Scanning electron micrographs of corolla hairs, anthers, pollen and gynoecium. A: corolla-lobe hairs (x5000), B: corolla-tube hairs (x5000), C: anther apex and filament attachment (x260), D: base of anther (x260), E: pollen (x4000) F: ovary, style base and nectary (x80), G: upper style and stigma (x300), H: upper style surface (x1100), I: mid-style hairs (x500).

c. 2 miles [3 km] N of settlement, Gnangara Pine Plantation, *A.S. George* 889, 3 Aug. 1960 (MEL, NSW, PERTH); 20 miles [32 km] N of Gingin on Dandaragan road, *A.S. George* 1698, 14 Nov. 1960 (MEL, PERTH); off Brand Hwy, 13 km N of Jurien Road, *E.A. Griffin* 2232, 14 Sep. 1979 (CANB, PERTH); 0.7 km W of Brand Hwy, 25.3 km N of junction with Gingin Brook road, *R. Hnatiuk* 790039, 27 Sep. 1979 (PERTH); end of Glendale Crescent, Jandakot, *G.J. Keighery* 11780, 21 Nov. 1990 (PERTH); near Nicholson road swamp, Canning Vale, *Kissane*, 29 Aug. 1949 (MEL 87664); margin of Jandakot airport, Perth, *Powell* 1311, 25 Aug. 1979 (CANB, K, L, NSW, PERTH); Cannington, *Kissane*, Sep. 1948 (PERTH 02429845); Verna Street, Gosnells, *R.J. Cranfield* 534, 1 Aug. 1978 (PERTH). Dale: Yornaning Reserve, c. 26 km ESE of Popanyinning, *B.G. Muir* 415, 12 Sep. 1975 (PERTH). Warren: c. 20 ml from Walpole near Nornalup Hwy, Burnett area, *P. Gnuske* 22, Oct.1966 (PERTH). AVON: near Lake Wagin, *Cronin*, 1890 (MEL 87666, NSW); Kellerberrin, *MacNeil*, 26 Sep. 1972 (PERTH 02429616); Corrigin district, *s.coll.*, 20 Sep. 1961 (PERTH 02429632).

Distribution and habitat. Found in the Irwin, Avon and Darling Districts of the South-West Botanical Province eastwards to the Coolgardie District of the South-Western Interzone. Often recorded as locally common, growing in deep greyish white or yellow sand within open heath or low open woodlands. (Figure 4).

Flowering and fruiting period. Flowers in August and September with fruit in November.

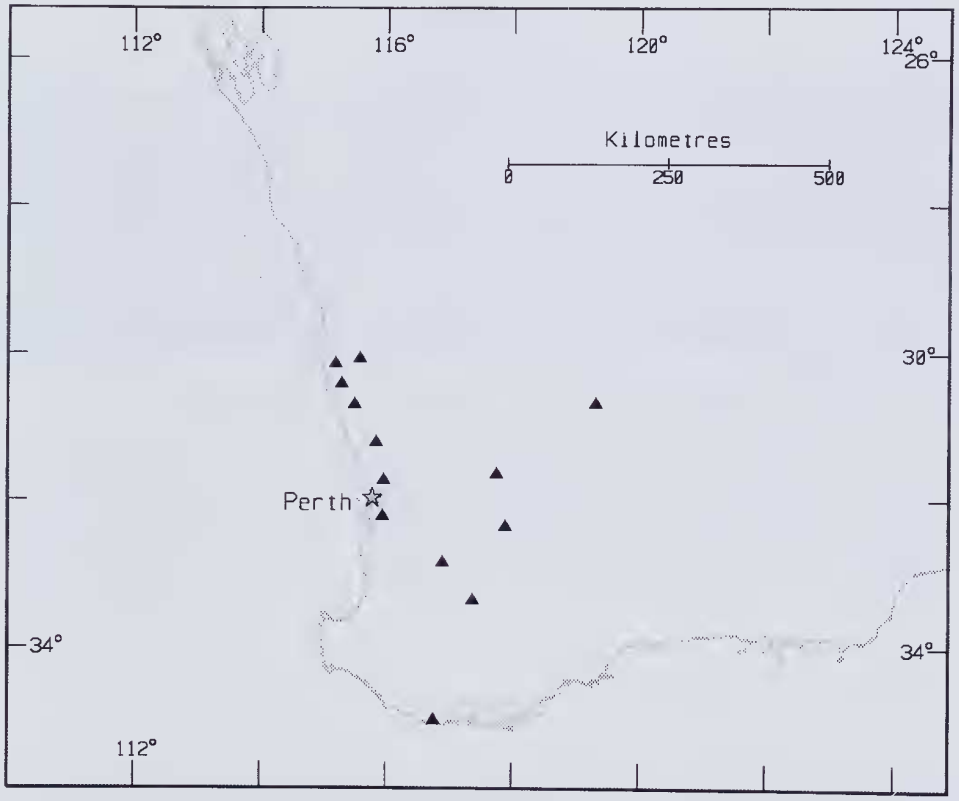

Figure 4. Distribution of *Croninia kingiana*.

Typification: C.A. Gardner annotated the label of a type fragment (designated syntype - PERTH 02429659) at PERTH ' This species is confined to the country between Gnangara and Cannington, so that a mistake has been made by Mueller in locality and collector.' More recent collections indicate a much wider distribution of this species (Figure 4) and hence the type location should not be dismissed before further collection in the area has been undertaken.

Conservation status. Herbarium records indicate the species is relatively widely distributed, but populations are small and some are threatened as they are near suburban developments. Known to be conserved in Badgingarra National Park and also possibly in Lesueur National Park.

Acknowledgements

I should like to thank Bob Roden for preparing the line drawing, Tony Martin for help with the scanning electron microscopy and Barbara Wiecek for preparing the photographs and map for publication. Thanks are due also to the Directors of PERTH and MEL herbaria for the loan of specimens. Australian Biological Resources Study grant funds assisted this project and are gratefully acknowledged.

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